REMARKS

Claims 70-96 are in the case.

Applicant's affirm the election of Group II and in order to advance prosecution cancel the claims drawn to the non-elected subject matter, without prejudice to filing a Divisional Application thereto.

Applicant's would first like to thank Examiner Singh for the very helpful telephone discussions that occurred on May 11 and May 15, 2006, concerning the present case as well as those cases recited in the double patenting rejection (*vide supra*). During the discussions, the principal basis for the rejection was discussed. More specifically, it is now Applicant's understanding that the rejection is maintained because, according to Examiner Singh, combining two steps into a single step is considered *prima facie* obvious *per se*.

Applicant's respectfully disagree.

As discussed in the present specification, the problem faced by the present inventors is the presence of even moderate amounts of hydrogen in cracked products, necessitating post-reactor separation. This problem is solved in the present invention by contacting a feedstream with a catalyst to produce a liquid and gaseous hydrocarbon product, the process characterized by the simultaneous cracking and the selective anaerobic combustion of the hydrogen produced by said cracking, wherein said cracking and simultaneously combusting of the resultant hydrogen from said cracking occurs in the fluid catalytic cracking reactor. The catalyst system comprises two components, one being a molecular sieve and the other being a metal oxide and/or sulfide comprising the metals set forth in more detail in Claim 70.

Kennedy et al. (U.S. 5,002,653), cited in the specification as prior art, is cited in the rejection under 35 USC §103 for its teaching of cracking. It is combined with Ou et al. (U.S. 5,907,076), for the latter patent's teaching of a hydrogen combustion catalyst. As stated above, the Examiner's position is that it is *prima facie* obvious to combine two steps into a single step. We are well-aware of cases pro and con on the issue of patentability of combining ingredients (e.g., *Kerkhoven* 205 USPQ 1069; *Geiger* 2 USPQ2d 1276; among others) or combining steps (*Baril* 124 USPQ 509; *Walter* 41 USPQ 304; *Gruskin* 110 USPQ 288, *Larkin* 89 USPQ 71; *Lambert* 101 USPQ 393; among others). These cases are not on point since the present invention is not simply a combination of ingredients nor a combination of steps - perhaps it is a combination

of two steps into a single step and the combination of a cracking catalyst and a hydrogen combustion catalyst.

In any event, reliance on any such *per se* rule is legally incorrect, since 35 USC §103 entitles applicant to issuance of otherwise proper patent unless the Patent and Trademark Office establishes that the invention, as claimed, is obvious over cited prior art based on specific comparison of that prior art with the presently-claimed limitations. See In re Ochiai, 37 USPQ2d 1127.

If case law is to be any guideline, the following, as stated by the Court in In re Gruskin 110 USPQ 288 at 292 (citing In re Phillip A. Shaffer, 43 CCPA 758), is at least as relevant as any of the aforementioned case law:

> "... it is not enough for a valid rejection to view the prior art in retrospect once an applicant's disclosure is known. The art applied should be viewed by itself to see if it fairly disclosed doing what an applicant has done. If it did not do so, the references may have been improperly combined."

Kennedy et al. (U.S. 5,002,653) employs a dual component cracking catalyst system comprising a zeolite and an ingredient described as a mixture of a calcium and magnesium-containing material and further described as effective for metals passivation (e.g., see col. 2, line 55). The reference is directed to solving the problem of catalyst deactivation due to the presence in the feedstream of metallic contaminants such as vanadium, nickel and iron.

As stated in the Official Action of December 21, 2005, Kennedy et al. does not disclose the metal-based component according to the present invention. The reference is silent on hydrogen combustion.

Gasoline is the primary product of the process of using the catalyst according to Kennedy et al. (col. 9, line 17). As discussed in Example 1, as the amount of metals passivator ("Additive B") is increased in the catalyst system, the amount of gasoline yield increases. As shown in Table IX, there is less hydrogen present in the effluent as more passivator is added. One of ordinary skill in the art would conclude from Example 1 that more gasoline and less hydrogen are being produced because the product of cracking is being more fully hydrogenated. This is exactly what the present inventors **don't** want to happen! This is a teaching away from the present invention.

Ou et al. (U.S. 5,907,076) is directed to a process for separation and removal of hydrogen from a feed comprising olefins. This is accomplished by reaction of a feedstream comprising

hydrogen, oxygen or oxygen-containing gas, and olefinic compounds such as ethylene, propylene, butylenes and the like with oxygen to yield water over an oxide catalyst containing a metal which may be selected from at least one element from Group IIIa, IVa, and V (which corresponds to Groups 3-5 using the new terminology for the Periodic Table).

Anaerobic hydrogen combustion is not discussed in Ou et al. The reference is not concerned with cracking.

Why would one of ordinary skill in the art combine the references? They would not. Would one of ordinary skill in the art expect success in such a combination? They would have no reason to expect a working catalyst, particularly given the unpredictability of catalysts. At best, the rejection is based on a combination of hindsight reconstruction and "obvious to try". Finally, when combined, the limitation of the present claims are not met.

Kennedy et al. is concerned with an FCC process to make gasoline, while Ou et al. is concerned with selectively removing hydrogen from a stream of light olefins. What is the relationship between these processes? None! Standing as separate pieces of prior art, there is no relationship between the processes. In fact they may be considered contrary to each other: Kennedy et al. wants gasoline while Ou et al. (who is an inventor of the present process) wants an unsaturated product (light olefins). The only reason to combine them is because of Applicant's invention. In other words, the only reason to combine them is in order to construct, with the benefit of hindsight based on Applicant's specification, Applicant's claims. This is improper.

Furthermore, they cannot be combined! Ou et al. is concerned with a reaction occurring in the presence of oxygen or oxygen-containing gas in a temperature range of from 40°C to 300°C (see Abstract), whereas the process of Kennedy et al. begins by preheating the feed to 315°C and has a reactor exit temperature of about 482°C to 593°C (see col. 8, from about line 30 to about line 50). How can such disparate processes be combined? They are for different purposes. The temperatures of the reactions do not fit together. They are not logically combinable!

Moreover, it is unclear what would result from such a combination ***a priori***. Kennedy et al. includes a metal passivator (particularly for vanadium) and Ou et al. includes a metal-based component (which may be vanadium). Would the metal passivator of Kennedy et al. passivate the metal-based component of Ou et al.? In what rational manner would the difference in temperature and atmosphere of the two different reactions be combined? The present inventors do not care to speculate about what such a combination would achieve because their invention does not result from a

combination of the two references, one teaching gasoline production and the other teaching removal of hydrogen from a stream of light olefins.

The law requires not only a reason to combine - and that reason must be found in the references themselves or at least some logical explanation beyond a *per se* rule - but the law also requires that a reasonable expectation of success must be found in the prior art, not in Applicant's disclosure. See In re Dow Chemical, 5 USPQ2d 1529 at 1531. *Even if* there was a reason to combine and *even if* such a combination resulted in meeting every limitation of the present invention, where is the expectation of success in combining two different catalytic processes into a single step?

The Official Action states that it would be obvious to combine the references "to avoid difficult hydrogen separation steps downstream of catalytic cracking". Ou et al. at col. 1, lines 21 *et seq.* states that such separation is costly but necessary. Ou et al. (and the "Ou" of that case is the same Ou who is an inventor of the present case) removes hydrogen from unsaturates in a step wholly separate from a cracking operation.

Removal of hydrogen simultaneously with cracking is part of the **present** invention. It was **not** part of Ou et al. ('076)! The present Applicants told you in the present specification that it is the present invention that avoids difficult separation steps downstream of cracking! It is not found in either reference alone nor can it found in the combination of references without benefit of Applicant's disclosure. It is perfect *hindsight* reconstruction - the Official Action finds obviousness at the **exact** point of the present invention without any evidence. Kennedy et al. does not discuss hydrogen separation after cracking as a problem - if anything, Kennedy et al. suggests hydrogen is used to provide more gasoline, as discussed above. Ou et al. does not discuss cracking and only discusses hydrogen separation in the context of a reaction with oxygen or other oxygen-containing gas. So this cannot be a reason to combine - absent Applicant's teachings.

The Official Action continually addresses most if not all of the depending claims specifically using similar hindsight reconstruction and "obvious to try" logic. However, in each case Applicants respectfully disagree with each of the specific rejections because for every claim the invention as a whole must be considered and thus the rejections fail because of the reasons set forth above, i.e., there is simply no reason to combine the two reference other than hindsight reconstruction and there is simply no expectation of success found in the prior art.

The Chin et al. (US '205), Green et al. (US '052) and Hettinger, Jr. et al. (US '241) do not cure the deficiencies of Kennedy et al. and Ou et al. None of these additional references suggest carrying out cracking and hydrogen combustion in a single reactor. *Even if* one accepts all the statements in

the Official Action regarding one or all of Chin et al. (US '205), Green et al. (US '052) and Hettinger, Jr. et al. (US '241), there is still nothing in any one or combination of the references that suggests addition of a hydrogen combustion catalyst to a cracking catalyst to carry out simultaneous cracking and hydrogen combustion in a single reactor. There is still no expectation of success in such a combination.

For these reasons, it is respectfully requested that the rejections under §103 be withdrawn.

With respect to the double patenting rejection, Applicant's enclose herewith appropriate terminal disclaimers and accordingly it is respectfully requested that this rejection be withdrawn.

Applicants believe the present application is in condition for examination on the merits and early indication of such is earnestly solicited.

Respectfully submitted,

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Andrew B. Griffis
Attorney for Applicants
Registration No. 36,336

ExxonMobil Chemical Co.
Law Technology
P.O. Box 2149
Baytown, Texas 77522-2149
Phone: 281-834-1886
Fax: 281-834-2495